

*Program*

**Semiconductor Technology  
for  
Ultra Large Scale Integrated Circuits and Thin Film Transistors III**

**An ECI Conference Series**

**June 26 - July 1, 2011**

**Hong Kong, China**

**Conference Chair**

**Yue Kuo**  
Texas A&M University, USA

**Conference Co-Chair**

**Gennadi Bersuker**  
Sematech, USA



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## **Sunday, June 26, 2011**

- 16:30 – 18:30 Registration
- 18:30 – 20:00 Welcome Reception

## **Monday, June 27, 2011**

- 07:00 – 08:00 Breakfast Buffet
- 08:00 – 08:10 **Welcome and Conference Overview**  
Y. Kuo and G. Bersuker, Conference Chairs  
N. Li, ECI Technical Liaison
- Plenary Talks**  
Session Chair: Y. Kuo, Texas A&M University
- 08:10 – 08:55 **It's a 3D World - Challenges and Opportunities for 3D Logic and Memory ULSI Devices**  
R. Jammy, SEMATECH
- 08:55 – 09:40 **Semiconductor Technology Evolution for ULSIC**  
H.-K. Kang, Samsung Electronics
- 09:40 – 10:25 **Nanoscale Metal Silicides**  
L. J. Chen, National Tsing Hua University
- 10:25 – 10:50 Coffee Break
- Nano Devices**  
Session Chairs: G. Bersuker, SEMATECH  
T. Asano, Kyushu University
- 10:50 – 11:20 **Silicon Grow-in-Place Nanowires and their Applications**  
S. Fonash, Pennsylvania State University, State Park, PA
- 11:20 – 11:50 **In-plane silicon nanowires for field effect transistor applications**  
L. Yu and P. R. i Cabarrocas, CNRS
- 11:50 – 12:20 **Application of Graphene and Carbon Nanotubes to Transistors and Interconnects**  
S. Sato, M. Nihei, and N. Yokoyama, AIST
- 12:20 – 14:00 Lunch
- 14:00 – 15:30 **Challenges in Extremely Large and Small Scalings**  
Moderators: S. Srinivasan and H.-K. Kang  
Panelists: TBA

15:30 – 16:00	Afternoon Coffee
16:00 – 18:30	Free Time for discussion, <i>ad hoc</i> sessions, leisure.
18:30– 19:30	<b><u>Poster session/Social Hour</u></b> Session Chairs: F. Yan, Hong Kong Polytechnic University
19:30 – 20:30	Dinner
20:30 – 21:30	Social Hour & Discussion

**Tuesday, June 28, 2011**

07:00 – 08:20 Breakfast Buffet

**IC Devices & Materials**

Session Chairs: W. Milne, Cambridge University  
S. J. Fonash, Pennsylvania State University

08:20 – 09:00 **Keynote: Unipolar CMOS Logic for Post-Si ULSI and for TFT Technologies**  
T. P. Ma, Yale University

09:00 – 09:30 **Epitaxial techniques for semiconductor manufacturing**  
S. Srinivasan, Applied Materials

09:30 – 10:00 **Electron and Hole Trapping in Polycrystalline and Amorphous Oxides for novel CMOS devices**  
A. Shluger, K. McKenna, University College London, G. Bersuker, SEMATECH

10:00 – 10:30 Coffee Break

**Oxide and Organic TFTs**

Session Chairs: J. Murota, Tohoku University  
S. Srivasanan, Applied Materials

10:30 – 11:00 **Zinc Oxide-Based Transparent TFTs Produced at Low Temperature**  
W. Milne, F. Li, M. Mann, R. Waddingham, A. Kiani and A. Flewitt, Cambridge University

11:00 – 11:30 **High performance a-IGZO TFT and TFT circuits for display application**  
J. Jang, Kyung Hee University

11:30 – 11:50 **Comparative Analysis of Organic Thin Film Transistor Structures for Flexible E-Paper and AMOLED Displays**  
L. Feng, X. Xu, X. Guo, Shanghai Jiao Tong University

12:00 – 14:00 Lunch

14:00 – 16:00 **Panel Discussion: Challenges in Materials and Fabrication**  
Moderators: M. Caymax and J. Jang  
Panelists: TBA

16:00 – 16:30 Afternoon Coffee

16:30 – 19:00 Free Time for discussion, *ad hoc* sessions, leisure.

19:00 – 20:30 Dinner

20:30 – 21:30 Social Hour & Discussion

## Wednesday, June 29, 2011

- 07:00 – 08:00 Breakfast Buffet
- Memories and Interfaces**  
Session Chairs: G. Fortunato, CNR-IMM  
J. Jang, Kyung Hee University
- 08:00 – 08:30 **Structural characteristics of transition metal oxides enabling resistive memory operations**  
G. Bersuker, SEMATECH
- 08:30 – 09:00 **Nonvolatile Memories for Nano and Giga Electronics Applications**  
Y. Kuo, Texas A&M University
- 09:00 – 09:30 **Understanding the switching mechanism in RRAM devices and the dielectric breakdown of ultrathin high-k gate stacks from first principles calculations**  
B. Magyari-Kope and Y. Nishi, Stanford University
- 09:30 – 9:50 **Manipulation of Graphene Properties by Interface Engineering**  
J. B. Xu, X. M. Wang, C. L. Wang, W. G. Xie, and J. Du
- 10:00 – 10:30 Coffee Break
- Si-based TFTs**  
Session Chairs: T. P. Ma, Yale University  
A. Shluger, University College London
- 10:30 – 11:00 **Short channel effects and drain field relief architectures in polysilicon TFTs**  
G. Fortunato, M. Cuscunà, L. Maiolo, L. Mariucci, M. Rapisarda, A. Pecora and A. Valletta, CNR-IMM, S.D. Brotherton, TFT Consultant, UK
- 11:00 – 11:30 **Similarities between  $\mu\text{-Si}$  TFT with very thin active layer and FD-SOI FETs**  
T. Mohammed-Brahim and K. Kandoussi, University Rennes 1
- 11:30 – 12:00 **Single-Grain Germanium TFTs**  
R. Ishihara, T. Chen, Delft University of Technology
- 12:00 – 12:20 **Source-gated transistors for versatile large area electronic circuit design and fabrication**  
R. A. Sporea, C. Opoku, M. Shkunov, J.n M. Shannon, and S. Ravi P. Silva, Advanced Technology Institute, X. Guo, Shanghai Jiao Tong University
- 12:20 – 14:00 Lunch
- 14:00 Free Time for leisure, recreation, discussion *ad hoc* sessions  
Optional Excursions  
Dinner on your own

## **Thursday, June 30, 2011**

- 07:00 – 08:00 Breakfast
- IC beyond Si**  
Session Chairs: O. Bonnaud, University Rennes 1  
H. S. Kwok, Hong Kong University of Science Technology
- 08:30 – 09:00 **SiGe, Ge and III-V materials and processes for beyond-Si CMOS and More-than-Moore applications**  
M. Caymax, IMEC
- 09:00 – 09:30 **Electrical Atomically Controlled CVD Processing for Doping in Future Si-Based Devices**  
J. Murota and M. Sakuraba, Tohoku University, B. Tillack, IHP and Technische Universitaet Berlin
- 09:30 – 10:00 **Physical modeling of charge transport and degradation in high-k stacks for logic device and memory applications**  
L. Larcher, A. Padovani, and L. Vandelli, Università di Modena e Reggio Emilia, G. Bersuker, SEMATECH
- 10:00 – 10:30 Coffee Break
- TFT Devices and Processes**  
Session Chairs: C. Matty, IMEC  
L. Larcher, Università di Modena e Reggio
- 10:30 – 11:00 **Success in Measuring the Lowest Off-state Current of Transistors in the World**  
Y. Sekine, K. Furutani, Y. Shionoiri, K. Kato, J. Koyama, S. Yamazaki, Semiconductor Energy Laboratory
- 11:00 – 11:30 **Self-Heating Issue of Poly-Si TFT on Glass Substrate**  
T. Asano and G. Nakagawa, Kyushu University
- 11:30 – 12:00 **Bridged-grain TFT**  
H. S. Kwok, M Wong, S Y Zhao and W Zhou, Hong Kong University of Science and Technology
- 12:20 – 14:00 Lunch
- 14:00 – 16:00 **Panel Discussion: Challenges in Applications**  
Moderators: T. P. Ma and Y. Saito  
Panelists:
- 16:00 – 16:30 Afternoon Coffee
- 16:30 – 19:00 Free Time for leisure, recreation, discussion *ad hoc* sessions  
19:00 – 22:00 Conference Banquet

**Friday, July 1, 2011**

- 07:00 – 08:00 Breakfast Buffet
- Packages and New Device Principles**  
Session Chairs: Y. Saito, Toshiba  
S. Sato, AIST
- 08:00 – 08:40 **Keynote: Recent Advances on Nano-materials for Advanced Packaging Applications**  
C. P. Wong, Chinese University of Hong Kong and Georgia Institute of Technology
- 08:40 – 09:10 **Spin-based MOSFET and Its Applications**  
Y. Saito, T. Inokuchi, M. Ishikawa, H. Sugiyama, T. Marukame, and T. Tanamoto, Toshiba Corporation
- 09:10 – 09:40 **Flexible Thin Film Transistor Arrays as an Enabling Platform Technology: Opportunities and Challenges**  
G. B. Raupp, City University of Hong Kong
- 9:40 – 10:10 Coffee Break
- 10:10 – 11:50 **TFT New Application**  
Session Chairs: C. P. Wong, Chinese University of Hong Kong  
R. Ishihara, Delft University of Technology
- 10:10 – 10:40 **Vertical Channel Thin Film Transistor: Improvement approach similar to multigate monolithic CMOS Technology**  
O. Bonnaud, Z. Peng, E. Jacques and R. Rogel, University Rennes 1
- 10:40 – 11:00 **Low Power 6.0-Inch Extended Graphics Array Reflective Liquid Crystal Display using Crystalline Indium Gallium Zinc Oxide Semiconductor with Electronic Paper Function**  
M. Kaneyasu, H. Miyake, T. Nishi, Y. Hirakata, J. Koyama, S. Yamazaki Semiconductor Energy Laboratory Co., R. Sato, M. Sakakura, Advanced Film Device Inc.
- 11:00– 11:30 **Biosensors Based on Organic Thin Film Transistors**  
F. Yan, Hong Kong Polytechnic University
- 11:30 – 11:50 **MILC PMOS Poly-Silicon TFT Circuits and Application in SOP**  
P. Sun, S. Zhao, T.-K. Ho, M. Wong, and H. S. Kwok, Hong Kong University of Science and Technology, Z. Meng, Nankai University
- 11:50 - 12:00 Conclusion of Conference  
Y. Kuo, Texas A&M University, and G. Bersuker, SEMATECH
- 12:10 Lunch  
14:00 Departure

### List of Posters

Authors	Topic
S. Amano, H. Miyake, T. Nishi, Y. Hirakata, J. Koyama, S. Yamazaki (SEL)	Low Power 6.0-inch Extended Graphics Array Transmissive Liquid Crystal Display using Crystalline Indium Gallium Zinc Oxide Semiconductor with Variable Frame Frequency
Y. Yuan, E. Ivanov (Tosoh)	Formation and Characterization of Rare Earth Metal Silicides
J. Li, F. Yan (Hong Kong Polytechnic University)	Low Voltage Organic Field-Effect Transistors based on poly(2,5bis(3-alkylthiophen-2-yl)-thieno[3,2-b]thiophene) semiconducting polymer
Sun Z., J. Li, F. Yan (Hong Kong Polytechnic University)	High carrier Mobility of P3HT induced by TiO <sub>2</sub> nanorods
X. Wang, C. Wang (CUHK)	High performance graphene devices on SiO <sub>2</sub> /Si substrate modified by highly ordered self-assembled monolayers